DATA EVALUATION RECORD

METHOPRENE

STUDY TYPE: Product Performance, OPPTS 810.1100
MRID 45214410

Prepared for

Biopesticides and Pollution Prevention Division
Office of Pesticide Programs
U.S. Environmental Protection Agency
1921 Jefferson Davis Highway
Arlington, VA 22202

Prepared by

Chemical Hazard Evaluation Group
Toxicology and Risk Analysis Section
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Oak Ridge National Laboratory
Oak Ridge, TN 37831
Task Order No. 69

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Disclaimer

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DATA EVALUATION RECORD

Reviewed by: [signature] 10/22/2001

Secondary Reviewer: Freshteh Toshrol, Ph.D., Senior Scientist [signature]

STUDY TYPE:	Product Performance
MRID NO:	45214410
TEST MATERIAL:	Apex (S and R,S formulations)
STUDY NO:	2693
SPONSOR:	Wellmark International
TESTING FACILITY:	University of Guelph, Vineland Station, Ontario, Canada
TITLE OF REPORT:	Efficacy of Apex Formulations against Mushroom Sciarid Flies
AUTHOR(S):	D. Rinker and G. Alm
STUDY COMPLETED:	September 7, 2000
CONFIDENTIALITY CLAIMS:	None
STUDY SUMMARY:	The results indicate that the liquid S-formulation of Apex is as effective as the liquid R,S formulation in controlling mushroom sciarid flies under current recommended usage. Of the tested granular formulations of Apex, the 1.5% methoprene formulation was ineffective and the 0.2% was effective primarily at the 2x rate level (68 and 70% efficacy). At the 1x level the efficacy was 35 and 60% and at the 0.5x level the efficacy was 0 and 26%.
CLASSIFICATION:	Supplemental (OPPTS testing not required)
GOOD LABORATORY PRACTICE	The study did not meet the requirements of 40 CFR part 160 and was not in compliance under Sections: 160.35; 160.47; 160.51: 160.81; 160.63; 160.105; 160.107; 160.195

TEST MATERIAL

Two formulations of Apex: 1) 65.3% R,S-methoprene emulsifiable concentrate; Lot Number 960207783; CAS # 65733-17-7. 2) 33.3% (s)-methoprene emulsifiable concentrate; Lot Number JM539, RF 9811; CAS # 65733-16-6

Reviewed by: **DATA EVALUATION RECORD** 10/22/2001

Secondary Reviewer: Freshteh Toshrol, Ph.D., Senior Scientist F Toshrol 10/22/01

STUDY TYPE:	Product Performance, OPPTS 810.1100
MRID NO:	45214411
TEST MATERIAL:	Methoprene
STUDY NO:	2692
SPONSOR:	Wellmark International
TESTING FACILITY:	USDA Grain Marketing and Research Center, Manhattan, Kansas
TITLE OF REPORT:	Residual Efficacy of two Formulations of Methoprene to Control Beetles in Stored Wheat
AUTHOR(S):	F. Arthur
STUDY COMPLETED:	September 7, 2000
CONFIDENTIALITY CLAIMS:	None
STUDY SUMMARY:	Two formulations of methoprene, tested at two temperatures (22 and 32°C), were effective in controlling the F_1 generation of the lesser grain borer (*Rhyzopertha dominica*) and the sawtoothed grain beetle (*Oryzaephilus surinamensis*) on hard red winter wheat after six months storage. F_1 generation adults and pupae of the red flour beetle (*Tribolium castaneum*) were not present in the treated grain; however, larvae were found at levels higher than that in the controls.
CLASSIFICATION:	Supplemental (testing not required by OPPTS)
GOOD LABORATORY PRACTICE	The study did not meet the requirements of 40 CFR part 160 and was not in compliance under Sections: 160.35; 160.47; 160.51: 160.81; 160.63; 160.105; 160.107; 160.195

TEST MATERIAL

Two formulations of methoprene: 1) 65.3% R,S-methoprene emulsifiable concentrate; Lot Number 960207783; CAS # 65733-17-7; and 2) 33.3% (s)-methoprene emulsifiable concentrate; Lot Number JM569, RF 9811; CAS # 65733-16-6

TEST METHOD

Laboratory tests were conducted to determine the efficacy of S-methoprene (1 and 5 ppm) and R-methoprene (10 ppm) to control the lesser grain beetle (*Rhyzopertha dominica*), the red flour beetle (*Tribolium castaneum*) and the sawtoothed grain beetle (*Oryzaephilus surinamensis*) on hard red winter wheat. The methoprene treatments were prepared by spraying wheat at the rate of 1.05 mL of formulated product per 1.5 kg of wheat. Untreated controls were sprayed with 1.05 mL of tap water per 1.5 kg of wheat. After each of four replicates were sprayed, they were placed in a glass jar and tumbled to ensure complete coverage. Each treated lot was subdivided into 42 individual plastic vials containg 30 g of wheat each [3 vials for each species x 2 residual storage temperatures (22 and 32°C) x 7 residual samples collected at six-week intervals, including an initial 0-month sample].

Treated wheat was stored for 0, 6, 12, 18, and 24 weeks at 57% RH. Bioassays were conducted on each treated sample after the storage period ended by placing twenty 1-2 week old mixed sex adult beetles into each vial. The 0-week sample was maintained at 27°C and 57% RH for 3 weeks, after which the adults were removed from the wheat, mortality was assessed, and the wheat and any remaining immatures were returned to the vials and maintained at a tempertaure of 27°C for 8 weeks. At the end of the 8-week period the number of F_1 immatures and adults were recorded. For the samples stored at 22°C or 32°C for time periods of 6 to 24 weeks, at the end of the storage period the vials were kept at 27°C for 2 days and then the bioassays were conducted as for the 0-week samples.

RESULTS SUMMARY

There was no difference in residual efficacy among the 3 methoprene tretaments or between the two tested temperatures. Survival of F_0 lesser grain borers ranged from 81.9 to 100% in the untreated controls and the 3 treatment groups. The number of F_1 adults ranged from 187.5 to 440.3 in the untreated control, but was <1 in all methoprene treatment groups. Similarly, in the tests with the sawtoothed grain beetle, survival of F_0 adults ranged from 71.3 to 100% in the untreated controls and the 3 treatment groups. The number of F_1 adults ranged from 0 to 62 in the untreated control, but was <1 in all treatment groups. Survival of F_0 red flour beetles ranged from 91 to 100% over all groups; the average number of larvae and F_1 adults ranged from 2.2 to 22.5 and 29.0-66.7, respectively, in the untreated control, and a few pupae were detected. In contrast, no pupae or adults were detected in the methoprene treatment groups, but the number of larvae ranged from 16.7 to 49.2.

STUDY AUTHOR'S CONCLUSIONS

The authors concluded that all three methoprene treatments were effective against the three tested species. Although larvae of the F_1 generation of the red flour beetle were found in all three treatment groups, the authors suggested that growth was delayed or arrested in this stage .

REVIEWER'S CONCLUSIONS

EPA has waived all requirements to submit efficacy data unless the pesticide product bears a claim to control termites or pests that pose a threat to human health (OPPTS 810.3000). Products designed to control populations of grain beetles do not appear to fall within those limits.

The results of the study indicate that the two tested methoprene formulations are effective in controlling F_1 generation development in lesser grain borer (*Rhyzopertha dominica*), and the sawtoothed grain beetle (*Oryzaephilus surinamensis*) in hard red winter wheat. However, the product was not totally effective in controlling the red flour beetle (*Tribolium castaneum*) in that F_1 larvae were found in the treated grain but adults and pupae were not.